

## WHAT IS CLAIMED IS:

1           1.       A network including one or more nodes connected by first and second rings  
2       formed by two or more transmission media, each transmission media including one or more  
3       signal channels, the network comprising:

4           a first node;

5           a second node connected to the first node by a first transmission media adapted to  
6       transmit transit data from the first node to the second node and a second transmission media  
7       adapted to transmit transit data from the second node to the first node;

8           a third node connected to the second node by a third transmission media adapted to  
9       transmit transit data from the second node to the third node and a fourth transmission media  
10       adapted to transmit transit data from the third node to the second node;

11           a fourth node connected to the first node by a fifth transmission media adapted to  
12       transmit transit data from the fourth node to the first node and a sixth transmission media  
13       adapted to transmit transit data from the first node to the fourth node;

14           the second node operable to receive transit data from the fourth transmission media;  
15       detect a first fault in the second transmission media, and forward the transit data from the  
16       third node received on the fourth transmission media to the third node on the third  
17       transmission media; and

18           the first node operable to receive transit data on the fifth transmission media; and,  
19       irrespective of the existence of the first fault, forward the transit data from the fourth node to  
20       the second node on the fifth and first transmission media.

21           2.       The network of claim 1, wherein the first node is operable to receive host  
22       data; upon not detecting the first fault, multiplex the host data with the transit data received  
23       on the fifth transmission media and forward the multiplexed data to the second node on the  
24       first transmission media; and upon detecting the first fault, forward the host data to the fourth  
25       node on the sixth transmission media.

26           3.       The network of claim 1, wherein the first node is operable to receive host data  
27       and, irrespective of the existence of the first fault, multiplex the host data with the transit data  
28       received on the fifth transmission media and forward the multiplexed data to the second node  
29       on the first transmission media.

30 4. The network of claim 1, wherein the second node is operable to multiplex first  
31 host data received into the second node on a first ring with the transit data received on the  
32 first ring from the third node creating first multiplexed data; forward the first multiplexed  
33 data to a second ring; receive second host data onto the second ring; multiplex the second  
34 host data with the first multiplexed data creating second multiplexed data; and forward the  
35 second multiplexed data to the third node on the third transmission media.

36 5. The network of claim 1, wherein the first through sixth transmission media are  
37 fiber.

38 6. The network of claim 1, wherein:  
39 the first node is operable to detect a second fault in the first transmission media; and  
40 forward the transit data from the fourth node received on the fifth transmission media to the  
41 fourth node on the sixth transmission media.

42 7. The network of claim 6, wherein:  
43 the second node is operable to multiplex first host data received into the second node  
44 on a first ring with the transit data received on the first ring from the third node creating first  
45 multiplexed data; forward the first multiplexed data to a second ring; receive second host  
46 data onto the second ring; multiplex the second host data with the first multiplexed data  
47 creating second multiplexed data; and forward the second multiplexed data to the third node  
48 on the third transmission media; and

49 the first node is operable to multiplex third host data received into the first node on  
50 the second ring with the transit data received on the second ring from the fourth node  
51 creating third multiplexed data; forward the third multiplexed data to the first ring; receive  
52 fourth host data onto the first ring; multiplex the fourth host data with the third multiplexed  
53 data creating fourth multiplexed data; and forward the fourth multiplexed data to the fourth  
54 node on the sixth transmission media.

55 8. The network of claim 1, wherein one or more nodes includes an add/drop  
56 multiplexer operable to extract or add host data.

57 9. The network of claim 1, wherein the first node detects the first fault by  
58 interpreting intelligent protection switching data.

59 10. The network of claim 9, wherein the first node is operable to broadcast the  
60 first fault to one or more nodes.

11. The network of claim 1, wherein the first node includes a counter operable to detect the transit data from the second node.

12. The network of claim 11, wherein the counter is operable to adjust whenever the transit data is not received.

13. The network of claim 1, wherein the first node is operable to detect an idle frame signal.

14. The network of claim 1, wherein the ring is a small ring.

15. In a system that includes first and a second rings coupling two or more nodes, a method for transmitting transit data through the system wherein the first ring is intact and the second ring has a fault between two nodes, the method comprising:

wrapping transit data from a second, faulted ring to a first, intact ring at an upstream node adjacent to a fault; and

maintaining transit data on the first, intact ring between the upstream node and a downstream node adjacent to the fault.

16. The method of claim 15, further comprising:

receiving host data for the first, intact ring at the downstream node; and

maintaining the host data on the first, intact ring.

17. The method of claim 15, further comprising:

receiving host data for the first, intact ring at the downstream node; and

wrapping the host data onto the second, faulted ring.

18. In a system that includes a first and a second ring coupling two or more nodes, a method for transmitting first and second transit and first and second host data through the system wherein the first and second rings have faults between two nodes, the method comprising:

wrapping in a first node first transit data from the second ring to the first ring;

receiving first host data in the first node along the first ring;

multiplexing the first transit data with the first host data, creating first multiplexed data;

routing the first multiplexed data along the first ring;

wrapping in a second node second transit data from the first ring to the second ring;

receiving second host data in the second node along the second ring;

92 multiplexing the second transit data with the second host data, creating a second  
93 multiplexed data; and  
94 routing the second multiplexed data along the second ring.

95 19. The method of claim 18, further comprising:  
96 receiving third host data in the first node along the second ring;  
97 multiplexing the third host data with the first transit data prior to wrapping the first  
98 transit data;  
99 wrapping the third host data with the first transit data from the second ring to the first  
100 ring;  
101 receiving fourth host data in the second node along the first ring;  
102 multiplexing the fourth host data with the second transit data prior to wrapping the  
103 second transit data; and  
104 wrapping the fourth host data with the second transit data from the first ring to the  
105 second ring.

106 20. A system that includes a first and a second ring coupling two or more nodes,  
107 comprising:  
108 a first node configured to maintain data on a second ring between a first and a second  
109 node upon detecting a fault in the first ring between the first and the second nodes; and  
110 a second node configured to wrap the data from the first ring onto the second ring.

111 21. The system of claim 20, wherein the first node is configured to receive external  
112 data from outside the ring along the second ring; and maintain the external data on the second  
113 ring.

114 22. The system of claim 20, wherein the first node is configured to receive external  
115 data from outside the ring along the second ring; and wrap the external data onto the first  
116 ring.

117 23. A network including one or more nodes connected by a first and a second ring  
118 formed by two or more transmission media, the network comprising:  
119 a first node;  
120 a second node connected to the first node by a first transmission media adapted to  
121 transmit transit data from the first node to the second node and a second transmission media  
122 adapted to transmit the transit data from the second node to the first node;

123 a third node connected to the second node by a third transmission media adapted to  
124 transmit the transit data from the second node to the third node and a fourth transmission  
125 media adapted to transmit the transit data from the third node to the second node;  
126 a fourth node connected to the first node by a fifth transmission media adapted to  
127 transmit the transit data from the fourth node to the first node and a sixth transmission media  
128 adapted to transmit the transit data from the first node to the fourth node; and  
129 the first node operable to detect a fault between the first and second nodes in the  
130 second transmission media and forward along a second ring first host data received into the  
131 first node along the second ring.

132 24. The network of claim 23, wherein upon detecting the fault, the second node is  
133 operable to wrap onto the second ring second host data received into the second node along a  
134 first ring.

135 25. The network of claim 23, wherein upon detecting the fault, the second node is  
136 operable to wrap onto the second ring first transit data received into the second node along a  
137 first ring, multiplex the first host data with the first transit data creating a first multiplexed  
138 data; and transmit the first multiplexed data along the second ring.